MPEP 2106, Applicant respectfully submits that those guidelines have at least been modified, if not superceded, by recent decisions of the United States Court of Appeals for the Federal Circuit. The guidelines are more restrictive than the decisions from the Court of Appeals for the Federal Circuit. Those guidelines were promulgated before the most important decision rendered to date by the Federal Circuit on this subject matter, namely *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 47 U.S.P.Q.2d 1596 (Fed. Cir. 1998), cert. den. (1999). Another extremely important decision from the United States Court of Appeals for the Federal Circuit which occurred after the aforementioned guidelines were promulgated is *AT&T Corp. v. Excel Communications, Inc.*, 50 U.S.P.Q.2d 1447 (Fed. Cir. 1999).

In the *State Street Bank* decision, the Court of Appeals for the Federal Circuit stated (47 U.S.P.Q.2d 1602) that the question of whether a claim encompasses statutory subject matter should focus on "the essential characteristics of the subject matter, in particular, its practical utility." The Federal Circuit also provided a test for identifying "unpatentable mathematical algorithms" by stating (47 U.S.P.Q.2d 1601) that "unpatentable mathematical algorithms are identifiable by showing that they are merely abstract ideas constituting disembodied concepts or truths that are not 'useful.'" The Federal Circuit further stated that "from a practical standpoint, this means that to be patentable an algorithm must be applied in a 'useful' way."

In the *AT& T Corp.* case, citing extensively from *State Street Bank*, the Federal Circuit stated (50 U.S.P.Q.2d 1453) that "the mere fact that a claimed invention involves inputting numbers, calculating numbers, outputting numbers, and storing numbers, in and of itself, would not render it non-statutory subject matter, unless, of course, its

operation does not produce a 'useful concrete and tangible.'" At the same page, the Federal Circuit stated "Our inquiry here focuses on whether the mathematical algorithm is applied in a practical manner to produce a useful result."

The subject matter of claims 1-20 of the present application is a method for producing a computer simulation to identify an electromagnetic field of a body which has a number of sub-regions containing a number of charges and currents. The end result of the method is an identification of the electromagnetic field of the body. This is the type of "tangible" thing which the Court of Appeals for the Federal Circuit has held to constitute statutory subject matter, and identifying the electromagnetic field associated with a body must unquestionably be considered a "useful" result in the context of these decisions.

Moreover, even if the Examiner's requirement of demonstrating "post-processing" of real data is adopted, Applicant respectfully submits claims 1-20 satisfy this standard. In each of the independent claims, the first step is to undertake a global multi-pole expansion and a local multi-pole expansion. These expansions result in a set of numerical values which represent real data, namely the effect of charges and currents at points in each of the sub-regions, as well as within a given sub-region. These numerical values are then used to determine the electromagnetic field of the body, in the second step of each of the independent claims. Thus, in the second step the real data obtained in the first step are "post-processed" to identify the electromagnetic field.

Applicant therefore respectfully submits that all claims of the application qualify as statutory subject matter under 35 U.S.C. §101.

Claim 12 was rejected under 35 U.S.C. §112 because the Examiner stated there is insufficient antecedent basis for the term "stability" in line 1 thereof. Claims 12 and 13 were rejected under §112, second paragraph, as being indefinite because the Examiner stated the terms "stability" (claim 12) and "compatibility" (claim 13) were not sufficiently definite. As to claim 12, this claim has been amended to make clear that stability refers to the stability of the body of which the electromagnetic field is being determined. The term "compatibility" in claim 13, as set forth in the claim, refers to electromagnetic compatibility, and is intended to encompass the meaning of DIN standard VDE 0870, cited at page 1 of the present specification. Since this is an industry standard, Applicant respectfully submits the term "electromagnetic compatibility" is unusually specifically known and understood by those of ordinary skill in the art. The Examiner's question relating to "victim and aggressor nets" is therefore not understood and is not seen to have any relationship to the aforementioned DIN standard.

All claims of the application are therefore respectfully submitted to be in full compliance with all provisions of 35 U.S.C. §112.

In paragraph 6 at page 3 of the Office Action, the Examiner stated that the claimed subject matter is taught in undergraduate college electromagnetic courses, and the subject matter of claim 2 is taught in graduate electromagnetic courses. The Examiner referred to a text book by Jackson entitled "Classical Dynamics." It is not clear whether this was intended to be a rejection based on this text, or based on common knowledge in the art, but if so the Examiner did not provide a copy of the text and Applicant respectfully submits that the manner by which paragraph 6 is written is

a gross over-simplification of the claimed subject matter. Of course, Applicant does not deny that it is unavoidable, when determining the magnetic field of a given region, to use the superposition principle, but all claims of the application are more detailed that general principle. The Examiner has not identified any prior art source in claim 6 which teaches or suggests the use of a global multi-pole expansion or a local multi-pole expansion in the context of identifying electromagnetic fields.

Claims 1-3, 14 and 15 were rejected under 35 U.S.C. §102(a) as being anticipated by Rokhlin et al. The Rokhlin et al. reference discloses a fast multi-pole method for electromagnetic simulations, but again there is no mention or suggestion in this article of undertaking a global multi-pole expansion and/or a local multi-pole expansion, and then superimposing the results of those expansions to simulate an electromagnetic field of a body, as set forth in each of the independent claims of the application. It should be noted that Applicant cited another article by Rokhlin at page 1 of the present specification, and identified a basic disadvantage with this conventional technique, namely the fact that the multi-pole coefficients are not explicitly calculated, and this, in turn, can result in spurious distortions which cause errors in the multi-pole expansions. Certainly as to independent claim 15 there is nothing even remotely as explicit as the method steps set forth in claim 15 in the Rokhlin et al. article relied upon by the Examiner. The Examiner has not even made an effort to show where those very explicit calculating steps of claim 15 are allegedly taught by Rokhlin et al.

Claims 1-3, 14 and 15 were also rejected under 35 U.S.C. §102(b) as being anticipated by Stalzer, parallel processing letters, or Stalzer Optical Physic Laboratory, or Coifman et al. Again, Applicant does not find any suggestion or explicit teaching in

any of those references to use a global multi-pole expansion and a local multi-pole expansion, and then to superimpose the results to identify the electromagnetic field of a body. The Examiner has merely stated that each of those references discloses "details of multi-pole expansions, matrix methods and regions," but has not identified even the basic steps of the independent claims of the present application of conducting a global multi-pole expansion, conducting a local multi-pole expansion, and superimposing the results from various regions of a body in order to identify the electromagnetic field.

Dependent claims 4-13 and 16-20 were rejected under 35 U.S.C. §103(a) as being unpatentable over the same references discussed above. Since each of those dependent claims adds further method steps to the novel methods of the respective independent claims, Applicant respectfully submits the Examiner has failed to present a *prima facie* case of obviousness based on these references themselves. Again, the Examiner has merely stated that the references respectively "disclose details of multi-pole expansions, matrix methods and regions," but has not suggested or provided a reasoning why a person of ordinary skill in the art would be motivated to modify any of those references to arrive at the subject matter of claims 4-13 and 16-20. Since those dependent claims were rejected under 35 U.S.C. §103 (as opposed to 35 U.S.C. §102), presumably the Examiner acknowledged that some modification must be necessary. Given this premise, it is also necessary for the Examiner to demonstrate some motivation or inducement found in the references to undertake such a modification. The Examiner's very general statements regarding these references provide no such

information, and it is for this reason that Applicant respectfully submits a *prima facie* case of obviousness has not been presented by the Examiner.

Lastly, claims 1-20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Turner et al. or Berne et al., in view of the official notice discussed above.

The Turner et al. reference discloses a method for molecular dynamics simulation, and an apparatus for executing the method. The model which is to be produced is based on information regarding atomic structure. Even though such modeling may represent a highly complex undertaking, this does not constitute a teaching or suggestion or inducement to those of ordinary skill in the art to employ multi-pole expansion for the purpose of simulating an electromagnetic field of a body. The Examiner cited language at column 17, line 36 in the Turner et al. reference, however, this reference does not make any statement regarding the determination of an electromagnetic field of a body, but instead refers to electrostatic reactions, or interactions.

The Berne et al. reference is a method for simulating biomolecular systems with remote electrostatic reactions. Again, there is no suggestion in this reference to undertake either a global or a local multi-pole expansion of regions of a body, and to superimpose the results of those expansions, in order to determine the electromagnetic field of the body.

In general, Applicant respectfully submits the Examiner has assumed that since the superposition principle is known, and since mathematical techniques for multi-pole expansion are known, it would somehow be obvious to employ multi-pole expansions in the context of electromagnetic field simulation. The references of record are the best

evidence against this conclusion, because despite extensive literature on the subject of multi-pole expansions, there is no statement in any of the references describing how a global multi-pole expansion and a local multi-pole expansion can be employed to simulate an electromagnetic field, as set forth in the claims of the present application.

All claims of the application are therefore submitted to be in condition for allowance, and early reconsideration of the application is respectfully requested.

Submitted by,

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